



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/577,626	04/28/2006	Ryuzo Iga	14321.84	9935
22913	7590	07/16/2008	EXAMINER	
WORKMAN NYDEGGER 60 EAST SOUTH TEMPLE 1000 EAGLE GATE TOWER SALT LAKE CITY, UT 84111			STAFFORD, PATRICK	
			ART UNIT	PAPER NUMBER
			2828	
			MAIL DATE	DELIVERY MODE
			07/16/2008	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/577,626

**Applicant(s)**

IGA ET AL.

**Examiner**

PATRICK STAFFORD

**Art Unit**

2828

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/ICE)  
Paper No(s)/Mail Date 4/2/2007.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 8, 11-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Takahiro et al (Japanese Published Patent Application 03-053582, hereafter ‘582).

Claims 1 and 16: ‘582 teaches a semiconductor optical device comprising:

a mesa-stripe stacked body (translation page 1, paragraph 2 and Fig. 3) including at least a p-type cladding layer (Fig. 3, part 23), an active layer (Fig. 3, part 19) and an n-type cladding layer (Fig. 3, part 24) is formed on a p-type semiconductor substrate (Fig. 3, part 21),

a current-blocking layer is buried in both sides of said stacked body (Fig. 3, parts 12-15), and an n-type over-cladding layer (Fig. 3, part 18) and an n-type contact layer (Fig. 3, part 22) are disposed on said current-blocking layer and said stacked body (Fig. 3, parts 18 and 22 disposed on part 12),

wherein said n-type over-cladding layer is made of a semiconductor crystal having a property for flattening a concavo-convex shape of upper surfaces of said current-blocking layer and said stacked body (Fig. 3, part 18 flat upper surface).

Claim 8: ‘582 teaches the semiconductor optical device according to claim 1, wherein said current-blocking layer is a high-resistive layer made of a semi-insulating semiconductor crystal (translation page 2, paragraph 1 and Fig. 3, parts 12-15).

Claim 11: '582 teaches the semiconductor optical device according to claim 1, wherein said current-blocking layer is formed of a high-resistive layer made of an n-type semiconductor crystal and a semi-insulating semiconductor crystal (translation page 2, paragraph 1 and Fig. 3, part 13).

Claim 12: '582 teaches the semiconductor optical device according to claim 11, wherein said high-resistive layer is made of a semi-insulating semiconductor crystal doped with at least one of ruthenium and iron (translation page 2, paragraph 1 and Fig. 3, part 12).

Claim 13: '582 teaches the semiconductor optical device according to claim 12, wherein said high-resistive layer is made of an InP crystal doped with at least one of ruthenium and iron (translation page 2, paragraph 1 and Fig. 3, parts 12-15).

Claim 14: '582 teaches the semiconductor optical device according to claim 1, wherein said current-blocking layer is made of an n-type semiconductor crystal and a p-type semiconductor crystal (translation page 1, paragraph 3 and Fig. 3, parts 14 and 13).

Claim 15: '582 teaches the semiconductor optical device according to claim 14, wherein said current-blocking layer is made of an n-type InP crystal and a p-type InP crystal (translation page 1, paragraph 3 and Fig. 3, parts 14 and 13).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahiro et al (Japanese Published Patent Application 03-053582, hereafter '582) in view of Takemi et al (U.S. Patent Application Publication 2004/0057483, hereafter '483).

Claim 2: '582 teaches the semiconductor optical device according to claim 1. It does not explicitly teach an n-type dopant for said semiconductor crystal is a group VI element.

However, '483 teaches a semiconductor optical device with an n-type semiconductor crystal with a group VI element as the dopant (paragraph 30, lines 9-12) in order to flat the surface of the cladding layer and reduce the number of crystal dislocations. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use an n-type semiconductor crystal with a group VI element as the dopant in order to flat the surface of the cladding layer and reduce the number of crystal dislocations.

Claim 3: '582 and '483 teach the semiconductor optical device according to claim 2. '483 teaches the n-type dopant is selenium (paragraph 30, lines 9-12).

Claim 4: '582 and '483 teach the semiconductor optical device according to claim 3. '483 teaches the doping concentration of the selenium is equal to or higher than  $5 \times 10^{18} \text{ cm}^{-3}$  (paragraph 72, lines 2-4).

Claims 5-7: '582 and '483 teach the semiconductor optical device according to claim 4. '483 teaches the semiconductor crystal is an InP crystal (paragraph 72, lines 2-4).

Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahiro et al (Japanese Published Patent Application 03-053582, hereafter '582) in view of Iga et al (U.S. Patent Application Publication 2002/0168856, hereafter '856).

Claim 9: '582 teaches the semiconductor optical device according to claim 8. It does not teach the high-resistive layer is doped with ruthenium. However, '856 teaches a high resistive layer doped with ruthenium (paragraph 21) in order to act as an electron compensator. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a high resistive layer doped with ruthenium in order to act as an electron compensator.

Claim 10: '582 and '856 teach the semiconductor optical device according to claim 9. '856 teaches the high-resistive layer is made of an InP crystal doped with ruthenium (paragraph 24, lines 2-4).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PATRICK STAFFORD whose telephone number is (571)270-1275. The examiner can normally be reached on M-Th 7:30-5 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MinSun Harvey can be reached on (571) 272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/P. S./  
Examiner, Art Unit 2828

/Minsun Harvey/  
Supervisory Patent Examiner, Art Unit 2828